

II. "On the direct Transformation of Iodide of Allyle into Iodide of Propyle." By MAXWELL SIMPSON, M.B., F.R.S.
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Iodide of allyle, as is well known, combines directly with two equivalents of metallic mercury, a well-defined crystalline compound being formed. Would it be possible to make the same body combine with two equivalents of hydrogen, and thus to open a direct passage from the allylic to the propylic series of compounds? *Indirectly* this transformation has been already effected by M. Berthelot through the intervention of propylene gas.

In order to determine the above point, I submitted iodide of allyle to the action of hydriodic acid gas. On passing this gas into the iodide, the latter became strongly heated and black from the liberation of a large quantity of iodine. As soon as the gas was observed to pass unabsorbed through the liquid, the latter was allowed to cool, and filtered through asbestos. It was then decolorized by agitation with a dilute solution of caustic potash, dried over chloride of calcium, and distilled. Almost the entire quantity passed over between 90° and 95° Cent. The portion distilling between 92° and 94° Cent. I collected apart and analysed. The numbers obtained correspond with the composition of iodide of propyle, as will be seen from the following table:—

	Theory.	Per cent.	Experiment.
C ₆	36	21·18	21·29
H ₇	7	4·11	4·16
I	127	74·71	
	170	100·00	

The specific gravity of the iodide is 1·73 at zero.

In order to satisfy myself that the body I had in my hands was really an ether of propylic alcohol, I endeavoured to prepare that alcohol from it. This I succeeded in doing in the following manner:—About 60 grammes of the iodide were added to an equivalent of oxalate of silver contained in a flask surrounded by water. The mixture became strongly heated from the violence of the reaction, and the decomposition was soon complete. It was then digested with ether. On submitting the ethereal solution to distillation, I observed that, as soon as the ether had passed over, the thermometer

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rose rapidly to 186°, and that the entire liquid, previously dissolved in the ether, distilled over between that temperature and 197° Cent. This was no doubt oxalate of propyle. On heating this body in a retort with solid caustic potash, I obtained a volatile distillate. This I then dried over chloride of calcium, and in order to secure its complete dehydration, treated it with a small piece of sodium. On re-distilling, I found that the entire liquid passed over between 83° and 88° Cent. The portion distilling between 85° and 88° gave on analysis results corresponding with the formula of propylic alcohol, as will be seen on inspecting the following table :—

	Theory.	Per cent.	Experiment.
C ₆	36	60·00	59·21
H ₈	8	13·33	13·47
O ₂	16	26·67	
	60	100·00	

By treating this body with iodine and phosphorus, I succeeded in regenerating iodide of propyle. This is a very ready method of preparing propylic alcohol when a large quantity is not required.

III. "On the Distillation of Mixtures: a Contribution to the Theory of Fractional Distillation." By J. A. WANKLYN, Esq. Communicated by Dr. FRANKLAND. Received April 17, 1863.

There are many points in the boiling of mixtures which are obscure. The tension of the vapours at the temperature whereat the mixture boils, and the proportions in which the constituents of the mixture are present, are not the only factors which determine the relative rates at which the constituents distil. There have, for instance, to be taken into account the adhesion of the liquids to one another, and the vapour-densities of these liquids. On the present occasion I have to call attention to the influence of this latter element, which influence seems to have been lost sight of by most of those who have applied themselves to this subject.

Leaving out of account for a moment the influence of adhesion, and simplifying the influence of the proportion in which the ingredients are present by taking equal weights of two liquids of different